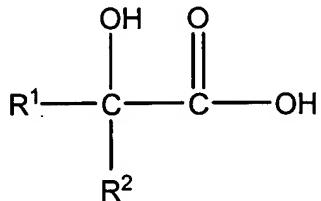


AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A process for resolving an enantiomeric mixture of an  $\alpha$ -hydroxy acid having the following formula:



wherein  $\text{R}^1$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, wherein  $\text{R}^2$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, the process comprising:

contacting an aqueous feed composition comprising an enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid or derivatives thereof with an enantioselective enzyme selected from the group consisting of porcine pancreatic lipase, lipase from Aspergillus niger, lipase from Candida antarctica, and mixtures thereof which preferentially catalyzes hydrolysis of a first enantiomeric ester to produce a first  $\alpha$ -hydroxy acid enantiomer corresponding to said first enantiomeric ester, thereby producing a reaction product comprising (i) the first  $\alpha$ -hydroxy acid enantiomer and (ii) unreacted  $\alpha$ -hydroxy acid ester, and

separating first  $\alpha$ -hydroxy acid enantiomer from unreacted  $\alpha$ -hydroxy acid ester.

2. (Original) A process as set forth in claim 1 wherein said aqueous feed composition is contacted with a heterogeneous catalyst comprising said enantioselective enzyme immobilized on a solid support.

3. (Original) A process as set forth in claim 2 wherein said aqueous feed composition is continuously or intermittently introduced into a catalytic reaction zone containing said heterogeneous catalyst, and said reaction product is continuously or intermittently withdrawn from said reaction zone.

4. (Original) A process as set forth in claim 3 wherein said heterogeneous catalyst comprises a plurality of catalyst bodies, each of said plurality of catalyst bodies comprising a porous support structure having said enzyme bound thereto or contained therewithin.

5. (Currently Amended) A process as set forth in claim 4 wherein said porous support structure comprises a polysaccharide composition selected from the group consisting of a polysaccharide, a polysaccharide/protein complex, a polysaccharide/protein complex cross-linked with a dialdehyde, and an alginate/gelatin complex.

Claims 6 to 13 canceled.

14. (Original) A process as set forth in claim 3 wherein said feed composition is continuously or intermittently introduced into a catalyst bed within said reaction zone, said catalyst bed comprising a heterogeneous catalyst comprising catalyst bodies on or within which said enzyme is immobilized; and a reaction mixture thus formed in the catalyst bed is caused to flow through the bed, said reaction product mixture being continuously or intermittently withdrawn from the bed.

Claims 15 to 16 canceled.

17. (Currently Amended) A process as set forth in claim 3 or 14 wherein said reaction product mixture withdrawn from the catalytic reaction zone is contacted in a phase extraction zone with an aqueous extractant and an organic extractant, thereby producing an aqueous extract and an organic extract, said first  $\alpha$ -hydroxy acid enantiomer corresponding to said first enantiomeric ester being predominantly partitioned to said aqueous extract and said unreacted  $\alpha$ -hydroxy acid ester being predominantly partitioned to said organic extract; and said organic extract is separated from said aqueous extract.

18. (Currently Amended) A process as set forth in claim 17 wherein said unreacted ester obtained in said organic extract is racemized and recycled by being and introduced into said catalytic reaction zone.

Claims 19 to 20 canceled.

21. (Original) A process for the preparation of a heterogeneous catalyst for use in an enantiomerically selective hydrolysis of an  $\alpha$ -hydroxy carboxylic acid, the process comprising:

preparing a premixture comprising an enantiomerically selective hydrolytic enzyme, an alkali metal saccharide and a protein;

heating the premixture to form a gel;

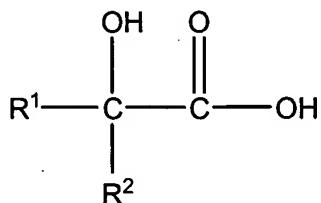
contacting the gel with a divalent cation, thereby forming a catalyst body comprising a solid porous support having said enzyme contained within the pores of the support; and

contacting enantiomeric mixture of an  $\alpha$ -hydroxy acid ester with said catalyst body, thereby preferentially hydrolyzing a first enantiomeric ester of said mixture of esters to produce a

first  $\alpha$ -hydroxy acid enantiomer corresponding to said first ester.

22. (Original) A process as set forth in claim 21 wherein contacting of said gel with said divalent cation comprises:  
forming drops of the gel; and  
introducing the drops of gel into an aqueous bead formation medium comprising a divalent metal ion.

23. (Currently Amended) A process for resolving an enantiomeric mixture of an  $\alpha$ -hydroxy acid having the following formula:



wherein  $\text{R}^1$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, wherein  $\text{R}^2$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, and wherein when  $\text{R}^1$  is a substituted hydrocarbyl comprising a phosphorus atom,  $\text{R}^2$  is hydrocarbyl or substituted hydrocarbyl, the process comprising:

forming a reaction mixture comprising (i) an enantioselective enzyme selected from the group consisting of porcine pancreatic lipase, lipase from Aspergillus niger, lipase from Candida antarctica, and mixtures thereof, and (ii) an enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid or derivatives thereof, wherein the enantioselective enzyme preferentially hydrolyzes a first enantiomeric ester to produce a first  $\alpha$ -hydroxy acid enantiomer corresponding to said first enantiomeric ester,

forming a reaction product from the reaction mixture, the reaction product comprising (i) the first  $\alpha$ -hydroxy acid enantiomer and (ii) unreacted  $\alpha$ -hydroxy acid ester, and separating the first  $\alpha$ -hydroxy acid enantiomer and unreacted  $\alpha$ -hydroxy acid ester from each other.

24. (Currently Amended) The process of claim 23, further comprising recovering the first  $\alpha$ -hydroxy acid enantiomer, wherein the first  $\alpha$ -hydroxy acid enantiomer is the L-isomer of the  $\alpha$ -hydroxy acid.

25. (Canceled)

26. (Currently Amended) The process of claim 23, further comprising recovering the unreacted  $\alpha$ -hydroxy acid ester and hydrolyzing the unreacted  $\alpha$ -hydroxy acid ester to form an enantiomeric mixture having an enantiomeric excess of the D-isomer of the  $\alpha$ -hydroxy acid.

Claims 27 to 33 canceled.

34. (Currently Amended) The process of claim 31 23, wherein the  $\alpha$ -hydroxy analogs of naturally occurring  $\alpha$ -amino acids are  $\alpha$ -hydroxy analogs of  $\alpha$ -amino acids selected from the group consisting of methionine and lysine.

35. (Canceled)

36. (Currently Amended) The process of any one of claims 23 to 35 claim 23, wherein the first  $\alpha$ -hydroxy acid enantiomer and the unreacted  $\alpha$ -hydroxy acid ester or derivatives thereof are [is] separated by subjection to a method selected from the group consisting of enantioselective chromatography, phase

extraction, and two-phase extraction comprising an organic phase and an aqueous phase.

Claims 37 to 40 canceled.

41. (Currently Amended) The process of ~~any one of claims 23 to 40~~ claim 23, wherein the pH of the reaction mixture is above at least about 5.

Claims 42 to 44 canceled.

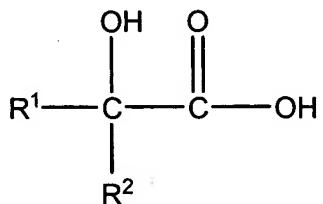
45. (Currently Amended) The process of ~~any one of claims 23 to 44~~ claim 23, wherein the temperature of the reaction mixture is above at least about 15° C.

Claims 46 to 49 canceled.

50. (Currently Amended) The process of ~~any one of claims 23 to 49~~ claim 23, wherein the enantiomeric mixture of esters of the α-hydroxy acid is formed in an [α] esterification reaction mixture comprising the α-hydroxy acid and an alcohol.

Claims 51 to 55 canceled.

56. (Currently Amended) A stereoisomeric mixture having an enantiomeric excess of a stereoisomer of an  $\alpha$ -hydroxy acid having the following formula:



wherein  $\text{R}^1$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, wherein  $\text{R}^2$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, and wherein when  $\text{R}^1$  is a substituted hydrocarbyl comprising a phosphorus atom,  $\text{R}^2$  must be a hydrocarbyl or substituted hydrocarbyl, the stereoisomeric mixture being formed by a process comprising:

forming a reaction mixture comprising (i) an enantioselective enzyme selected from the group consisting of porcine pancreatic lipase, lipase from Aspergillus niger, lipase from Candida antarctica, and mixtures thereof, and (ii) an enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid, wherein the enantioselective enzyme preferentially hydrolyzes a first enantiomeric ester to produce a first mixture of  $\alpha$ -hydroxy acid enantiomers that contains an enantiomeric excess of the first  $\alpha$ -hydroxy acid enantiomer,

forming a reaction product from the reaction mixture comprising (i) the first mixture of  $\alpha$ -hydroxy acid enantiomers, and (ii) unreacted second  $\alpha$ -hydroxy acid ester,

separating the first mixture of  $\alpha$ -hydroxy acid enantiomers and unreacted  $\alpha$ -hydroxy acid ester enantiomers in the reaction product from each other, and

recovering the first mixture of  $\alpha$ -hydroxy acid enantiomers to form the stereoisomeric mixture.

57. (Currently Amended) The process stereoisomeric mixture of claim 56, wherein the first mixture of  $\alpha$ -hydroxy acid enantiomers is comprised of an enantiomeric excess of the L-isomer of the  $\alpha$ -hydroxy acid.

58. (Currently Amended) The process stereoisomeric mixture of claim 56, further comprising recovering the unreacted  $\alpha$ -hydroxy acid ester and hydrolyzing the unreacted  $\alpha$ -hydroxy acid ester to form a second mixture of  $\alpha$ -hydroxy acid enantiomers that has an enantiomeric excess of the D-isomer of the  $\alpha$ -hydroxy acid.

Claims 59 to 65 canceled.

66. (Currently Amended) The stereoisomeric mixture of claim [63] 56, wherein the  $\alpha$ -hydroxy analog analogs of naturally occurring  $\alpha$ -amino acids are  $\alpha$ -hydroxy analogs of  $\alpha$ -amino acids is selected from the group consisting of methionine and lysine.

67. (Currently Amended) The stereoisomeric mixture of claim [63] 56, wherein the  $\alpha$ -hydroxy analog of a naturally occurring  $\alpha$ -amino acid is comprises 2-hydroxy-4-(methylthio)butyric acid.

68. (Currently Amended) The stereoisomeric mixture of any one of claims 56 to 67 claim 56, wherein the hydrolyzed  $\alpha$ -hydroxy acid or derivative thereof and the unreacted  $\alpha$ -hydroxy acid ester or derivative thereof are [is] separated by subjecting to a method selected from the group consisting of enantioselective chromatography, phase extraction, and two-phase extraction comprising an organic phase and an aqueous phase.

Claims 69 to 72 canceled.

73. (Currently Amended) The stereoisomeric mixture of any one of claims 56 to 72 claim 56, wherein the pH of the reaction mixture is above at least about 5.

Claims 74 to 76 canceled.

77. (Currently Amended) The stereoisomeric mixture of any one of claims 56 to 72 claim 56, wherein the temperature of the reaction mixture is above at least about 15° C.

Claims 78 to 81 canceled.

82. (Currently Amended) The stereoisomeric mixture of any one of claims 56 to 81 claim 56 wherein the enantiomeric mixture of esters of the α-hydroxy acid or derivative thereof is formed in a esterification reaction mixture comprising the α-hydroxy acid or derivative thereof and an alcohol.

Claims 83 to 87 canceled.

88. (Currently Amended) The stereoisomeric mixture of any one of claims 56 to 87 claim 56 wherein at least 60% of the first mixture α-hydroxy acid enantiomers are the L-isomer of α-hydroxy acid.

Claims 89 to 91 canceled.

92. (Currently Amended) The stereoisomeric mixture of any one of claims 56 to 87 claim 56 wherein at least 60% of the second mixture α-hydroxy acid enantiomers are the D-isomer of α-hydroxy acid.

Claims 93 to 95 canceled.

96. (Currently Amended) A feed supplement comprising the stereoisomeric mixture of ~~any one of claims 56 to 87~~ claim 56.

97. (Original) The feed supplement of claim 96 wherein at least 60% of the first mixture of  $\alpha$ -hydroxy acid enantiomers are the L-isomer of  $\alpha$ -hydroxy acid.

Claims 98 to 100 canceled.

101. (Currently Amended) A feed supplement comprising the second mixture of  $\alpha$ -hydroxy acid enantiomers of ~~any one of claims 56 to 87~~ claim 56 wherein the first mixture of  $\alpha$ -hydroxy acid enantiomers has an enantiomeric excess of the D-isomer of the  $\alpha$ -hydroxy acid.

102. (Original) The feed supplement of claim 101 wherein at least 60% of the second mixture  $\alpha$ -hydroxy acid enantiomers are the D-isomer of  $\alpha$ -hydroxy acid.

Claims 103 to 105 canceled.

106. (Currently Amended) A process for supplementing the diet of an animal, the process comprising providing the feed supplement of ~~any one of claims 56 to 87~~ claim 96 to the animal.

Claims 107 to 112 canceled.

113. (Original) A process for producing and resolving an  $\alpha$ -hydroxy acid enantiomer or derivative thereof in an enantiomeric mixture, the process comprising:

forming a first reaction mixture comprising an  $\alpha$ -hydroxy acid and an alcohol,

forming a first product mixture from the first reaction mixture, the first product mixture comprising an  $\alpha$ -hydroxy ester corresponding to the  $\alpha$ -hydroxy acid,

forming a second reaction mixture from the first product mixture, the second reaction mixture comprising the  $\alpha$ -hydroxy ester and an enantioselective enzyme,

forming a second product mixture from the second reaction mixture, the second product mixture comprising a first  $\alpha$ -hydroxy acid and unhydrolyzed  $\alpha$ -hydroxy ester, wherein the first  $\alpha$ -hydroxy acid is produced by the enantioselective hydrolysis of a first enantiomer of the  $\alpha$ -hydroxy ester, and

separating the first  $\alpha$ -hydroxy acid and unhydrolyzed  $\alpha$ -hydroxy ester in the second product mixture from each other.

114. (Currently Amended) The process of claim 113 wherein the  $\alpha$ -hydroxy acid in the first reaction mixture is selected from the group consisting of glycolic acid, lactic acid, glyceric acid, tartaric acid, citric acid, glyoxylic acid, pyruvic acid, mandelic acid, malic acid, benzilic acid,  ~~$\alpha$ -hydroxy analogs of naturally occurring  $\alpha$ -amino acids, ;  $\alpha$ -hydroxy analogs of asparagine, glycine, alanine, valine, leucine, isoleucine, phenylalanine, proline, serine, threonine, cysteine, methionine, tryptophan, tyrosine, glutamine, aspartic acid, glutamic acid, lysine, arginine, and histidine; and derivatives thereof.~~

Claims 115 to 119 canceled.

120. (Currently Amended) The process of ~~any one of claims 113 to 119~~ claim 113 wherein the enantioselective enzyme is a lipase enzyme.

Claims 121 to 125 canceled.

126. (Currently Amended) The process of ~~any one of claims~~  
~~113 to 1253~~ claim 113 wherein the first reaction mixture is at least about 65° C.

Claims 127 to 129 canceled.

130. (Currently Amended) The process of ~~any one of claims~~  
~~113 to 129~~ claim 113 wherein the second reaction mixture has a pH of at least about 5.

Claims 131 to 133 canceled.

134. (Currently Amended) The process of ~~any one of claims~~  
~~113 to 133~~ claim 113 wherein the second reaction mixture is at least about 15° C.

Claims 135 to 144 canceled.

145. (Currently Amended) The process of ~~any one of claims~~  
~~113 to 144~~ claim 113 wherein the enantioselective enzyme is immobilized and the second reaction mixture comprising the α-hydroxy ester is continuously contacted with the enantioselective enzyme to continuously hydrolyze the α-hydroxy acid ester to produce the second product mixture comprising the first α-hydroxy acid and unhydrolyzed α-hydroxy ester.

146. (Original) The process of claim 145 wherein the first α-hydroxy acid is continuously removed from the second product mixture.

147. (Original) A process for producing and continuously resolving an  $\alpha$ -hydroxy acid enantiomer or derivative thereof in an enantiomeric mixture, the process comprising:

forming a first reaction mixture comprising an  $\alpha$ -hydroxy acid and an alcohol,

forming a first product mixture from the first reaction mixture, the first product mixture comprising an  $\alpha$ -hydroxy ester corresponding to the  $\alpha$ -hydroxy acid,

forming a second reaction mixture from the first product mixture, the second reaction mixture comprising the  $\alpha$ -hydroxy ester,

forming a second product mixture by continuously contacting the second reaction mixture with an immobilized enantioselective enzyme, the second product mixture comprising a first  $\alpha$ -hydroxy acid and unhydrolyzed  $\alpha$ -hydroxy ester, wherein the first  $\alpha$ -hydroxy acid is produced by the enantioselective hydrolysis of a first enantiomer of the  $\alpha$ -hydroxy ester, and

continuously separating the  $\alpha$ -hydroxy acid produced by the enantioselective hydrolysis of the  $\alpha$ -hydroxy ester from the unreacted  $\alpha$ -hydroxy ester.

Claims 148 and 149 canceled.

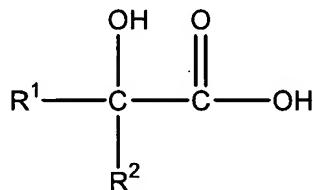
150. (Currently Amended) The process of ~~any one of claims 147 to 149~~ claim 147 wherein the first  $\alpha$ -hydroxy acid and unreacted  $\alpha$ -hydroxy ester are intermittently removed from the reaction zone.

151. (Currently Amended) The process of ~~any one of claims 147 to 150~~ claim 147 wherein the first  $\alpha$ -hydroxy acid and unreacted  $\alpha$ -hydroxy ester are continuously removed from the reaction zone.

152. (Currently Amended) The process of ~~any one of claims 147 to 151~~ claim 147 wherein the second reaction mixture comprising the  $\alpha$ -hydroxy ester is continuously introduced to the immobilized enantioselective enzyme within a reaction zone in which the  $\alpha$ -hydroxy ester is hydrolyzed to produce the first  $\alpha$ -hydroxy acid.

Claims 153 and 154 canceled.

155. (New) A process for resolving an enantiomeric mixture of an  $\alpha$ -hydroxy acid having the following formula:



wherein  $\text{R}^1$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, and wherein  $\text{R}^2$  is hydrogen, hydrocarbyl or substituted hydrocarbyl, the process comprising:

forming a reaction mixture comprising (i) a heterogeneous catalyst comprising the enantioselective enzyme immobilized on a solid support, and (ii) an enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid or derivatives thereof, wherein the enantioselective enzyme preferentially hydrolyzes a first enantiomeric ester to produce a first  $\alpha$ -hydroxy acid enantiomer corresponding to said first enantiomeric ester,

forming a reaction product from the reaction mixture, the reaction product comprising (i) the first  $\alpha$ -hydroxy acid enantiomer and (ii) unreacted  $\alpha$ -hydroxy acid ester, and

separating the first  $\alpha$ -hydroxy acid enantiomer and unreacted  $\alpha$ -hydroxy acid ester from each other.

156. (New) The process of claim 155 wherein the enantiomeric mixture is continuously or intermittently introduced into a catalytic reaction zone containing said heterogeneous catalyst and wherein the reaction product is continuously or intermittently withdrawn from said reaction zone.

157. (New) The process of claim 155 wherein said heterogeneous catalyst comprises a plurality of catalyst bodies, each of said plurality of catalyst bodies comprising a porous support structure having said enzyme bound thereto or contained therewithin.

158. (New) A process for resolving an enantiomeric mixture of an  $\alpha$ -hydroxy acid, wherein the  $\alpha$ -hydroxy acid is selected from the group consisting of glycolic acid, lactic acid, glyceric acid, tartaric acid, citric acid, glyoxylic acid, pyruvic acid, malic acid, benzilic acid;  $\alpha$ -hydroxy analogs of asparagine, alanine, valine, isoleucine, phenylalanine, proline, serine, threonine, cysteine, methionine, tryptophan, tyrosine, glutamine, aspartic acid, glutamic acid, lysine, arginine, and histidine; and derivatives thereof, the process comprising:

contacting an aqueous feed composition comprising an enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid or derivatives thereof with an enantioselective enzyme which preferentially catalyzes hydrolysis of a first enantiomeric ester to produce a first  $\alpha$ -hydroxy acid enantiomer corresponding to said first enantiomeric ester, thereby producing a reaction product comprising (i) the first  $\alpha$ -hydroxy acid enantiomer and (ii) unreacted  $\alpha$ -hydroxy acid ester, and

separating first  $\alpha$ -hydroxy acid enantiomer from unreacted  $\alpha$ -hydroxy acid ester.

159. (New) A process as set forth in claim 158 wherein said aqueous feed composition is contacted with a heterogeneous catalyst comprising said enantioselective enzyme immobilized on a solid support.

160. (New) A process as set forth in claim 159 wherein said aqueous feed composition is continuously or intermittently introduced into a catalytic reaction zone containing said heterogeneous catalyst, and wherein said reaction product is continuously or intermittently withdrawn from said reaction zone.

161. (New) A process as set forth in claim 159 wherein said heterogeneous catalyst comprises a plurality of catalyst bodies, each of said plurality of catalyst bodies comprising a porous support structure having said enzyme bound thereto or contained therewithin.

162. (New) The process of claim 161 wherein said porous support structure comprises a composition selected from the group consisting of a polysaccharide, a polysaccharide/protein complex, a polysaccharide/protein complex cross-linked with a dialdehyde, and an alginate/gelatin complex.

163. (New) A process as set forth in claim 160 wherein said feed composition is continuously or intermittently introduced into a catalyst bed within said reaction zone, said catalyst bed comprising a heterogeneous catalyst comprising catalyst bodies on or within which said enzyme is immobilized; and a reaction mixture thus formed in the catalyst bed is caused to flow through the bed, said reaction product mixture being continuously or intermittently withdrawn from the bed.

164. (New) A process as set forth in claim 160 wherein said reaction product mixture withdrawn from the catalytic reaction zone is contacted in a phase extraction zone with an aqueous extractant and an organic extractant, thereby producing an aqueous extract and an organic extract, said first  $\alpha$ -hydroxy acid enantiomer corresponding to said first enantiomeric ester being predominantly partitioned to said aqueous extract and said unreacted  $\alpha$ -hydroxy acid ester being predominantly partitioned to said organic extract; and said organic extract is separated from said aqueous extract.

165. (New) A process as set forth in claim 164 wherein said unreacted ester obtained in said organic extract is racemized and recycled by being introduced into said catalytic reaction zone.

166. (New) The process of claim 158, further comprising recovering the first  $\alpha$ -hydroxy acid enantiomer, wherein the first  $\alpha$ -hydroxy acid enantiomer is the L-isomer of the  $\alpha$ -hydroxy acid.

167. (New) The process of claim 158, further comprising recovering the unreacted  $\alpha$ -hydroxy acid ester and hydrolyzing the unreacted  $\alpha$ -hydroxy acid ester to form an enantiomeric mixture having an enantiomeric excess of the D-isomer of the  $\alpha$ -hydroxy acid.

168. (New) The process of claim 158, wherein the enantioselective enzyme is a lipase enzyme.

169. (New) The process of claim 158, wherein the  $\alpha$ -hydroxy analogs are  $\alpha$ -hydroxy analogs of  $\alpha$ -amino acids selected from the group consisting of methionine and lysine.

170. (New) The process of claim 158, wherein the first  $\alpha$ -hydroxy acid enantiomer and the unreacted  $\alpha$ -hydroxy acid ester or derivatives thereof are separated by subjection to a method selected from the group consisting of enantioselective chromatography, phase extraction, and two-phase extraction comprising an organic phase and an aqueous phase.

171. (New) The process of claim 158, wherein the pH of the reaction mixture is above at least about 5.

172. (New) The process of claim 158, wherein the temperature of the reaction mixture is above at least about 15° C.

173. (New) The process of claim 158, wherein the enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid is formed in an esterification reaction mixture comprising the  $\alpha$ -hydroxy acid and an alcohol.

174. (New) A stereoisomeric mixture having an enantiomeric excess of a stereoisomer of an  $\alpha$ -hydroxy acid, wherein the  $\alpha$ -hydroxy acid is selected from the group consisting of glycolic acid, lactic acid, glyceric acid, tartaric acid, citric acid, glyoxylic acid, pyruvic acid, malic acid, benzilic acid;  $\alpha$ -hydroxy analogs of asparagine, alanine, valine, isoleucine, phenylalanine, proline, serine, threonine, cysteine, methionine, tryptophan, tyrosine, glutamine, aspartic acid, glutamic acid, lysine, arginine, and histidine; and derivatives thereof, the stereoisomeric mixture being formed by a process comprising:

forming a reaction mixture comprising (i) an enantioselective enzyme, and (ii) an enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid, wherein the enantioselective enzyme preferentially hydrolyzes a first enantiomeric ester to

produce a first mixture of  $\alpha$ -hydroxy acid enantiomers that contains an enantiomeric excess of the first  $\alpha$ -hydroxy acid enantiomer,

forming a reaction product from the reaction mixture comprising (i) the first mixture of  $\alpha$ -hydroxy acid enantiomers, and (ii) unreacted second  $\alpha$ -hydroxy acid ester,

separating the first mixture of  $\alpha$ -hydroxy acid enantiomers and unreacted  $\alpha$ -hydroxy acid ester enantiomers in the reaction product from each other, and

recovering the first mixture of  $\alpha$ -hydroxy acid enantiomers to form the stereoisomeric mixture.

175. (New) The stereoisomeric mixture of claim 174, wherein the first mixture of  $\alpha$ -hydroxy acid enantiomers is comprised of an enantiomeric excess of the L-isomer of the  $\alpha$ -hydroxy acid.

176. (New) The stereoisomeric mixture of claim 174, further comprising recovering the unreacted  $\alpha$ -hydroxy acid ester and hydrolyzing the unreacted  $\alpha$ -hydroxy acid ester to form a second mixture of  $\alpha$ -hydroxy acid enantiomers that has an enantiomeric excess of the D-isomer of the  $\alpha$ -hydroxy acid.

177. (New) The stereoisomeric mixture of claim 174, wherein the enantioselective enzyme is a lipase enzyme.

178. (New) The stereoisomeric mixture of claim 174, wherein the  $\alpha$ -hydroxy analog is selected from the group consisting of methionine and lysine.

179. (New) The stereoisomeric mixture of claim 174, wherein the  $\alpha$ -hydroxy analog comprises 2-hydroxy-4-(methylthio)butyric acid.

180. (New) The stereoisomeric mixture of claim 174, wherein the hydrolyzed  $\alpha$ -hydroxy acid or derivative thereof and the unreacted  $\alpha$ -hydroxy acid ester or derivative thereof are separated by subjection to a method selected from the group consisting of enantioselective chromatography, phase extraction, and two-phase extraction comprising an organic phase and an aqueous phase.

181. (New) The stereoisomeric mixture of claim 174, wherein the pH of the reaction mixture is above at least about 5.

182. (New) The stereoisomeric mixture of claim 174, wherein the temperature of the reaction mixture is above at least about 15°C.

183. (New) The stereoisomeric mixture of claim 174, wherein the enantiomeric mixture of esters of the  $\alpha$ -hydroxy acid or derivative thereof is formed in a esterification reaction mixture comprising the  $\alpha$ -hydroxy acid or derivative thereof and an alcohol.

184. (New) The stereoisomeric mixture of claim 174 wherein at least 60% of the first mixture  $\alpha$ -hydroxy acid enantiomers are the L-isomer of  $\alpha$ -hydroxy acid.

185. (New) The stereoisomeric mixture of claim 174 wherein at least 60% of the second mixture  $\alpha$ -hydroxy acid enantiomers are the D-isomer of  $\alpha$ -hydroxy acid.

186. (New) A feed supplement comprising the stereoisomeric mixture of claim 174.

187. (New) The feed supplement of claim 186 wherein at least 60% of the first mixture of  $\alpha$ -hydroxy acid enantiomers are the L-isomer of  $\alpha$ -hydroxy acid.